

Richmond Lake

Site Description

Location

Water designation number (WDN)	03-0008-00
Legal description	T124N-R64W-Sec.1,12,13,14,25,36 T125N-R65W-Sec.19,22,23,24,25
County (ies)	Brown
Location from nearest town	5.0 miles north and 4.0 miles west of Aberdeen

Survey Dates and Netting Information

Survey dates	August 5-7, 2014 (FN, GN) September 11, 2014 (EF-WAE)
Frame net sets (n)	18
Gill net sets (n)	6
Electrofishing-WAE (min)	62

Morphometry

Watershed area (acres)	103,128
Surface area (acres)	823
Maximum depth (ft)	23
Mean depth (ft)	8

Ownership and Public Access

Three public access sites are present on Richmond Lake; these are located on the east (bass club), south (recreation area), and southeast (spillway access) shorelines and are maintained by the SDGFP (Figure 1). Lands adjacent to the lake are under state and private ownership.

Watershed and Land Use

The Richmond Lake watershed is a sub-watershed within the Moccasin Creek watershed and is predominately comprised of agricultural lands with a small municipality (Leola) being located in the northwestern portion of the watershed. Much of the shoreline is rimmed with homes and cabins that are connected to a central sewer collection system (McLaury 2006).

Water Level Observations

Water levels on Richmond Lake are not monitored by SDDENR.

Fish Management Information

Primary species	black crappie, bluegill, walleye
Other species	black bullhead, channel catfish, common carp, green sunfish, largemouth bass, northern pike, pumpkinseed, rock bass, smallmouth bass, spottail shiner, white bass, white sucker, yellow perch
Lake-specific regulations	largemouth/smallmouth bass: minimum length 15" walleye: minimum length 15"
Management classification	warm-water permanent impoundment
Fish consumption advisories	none

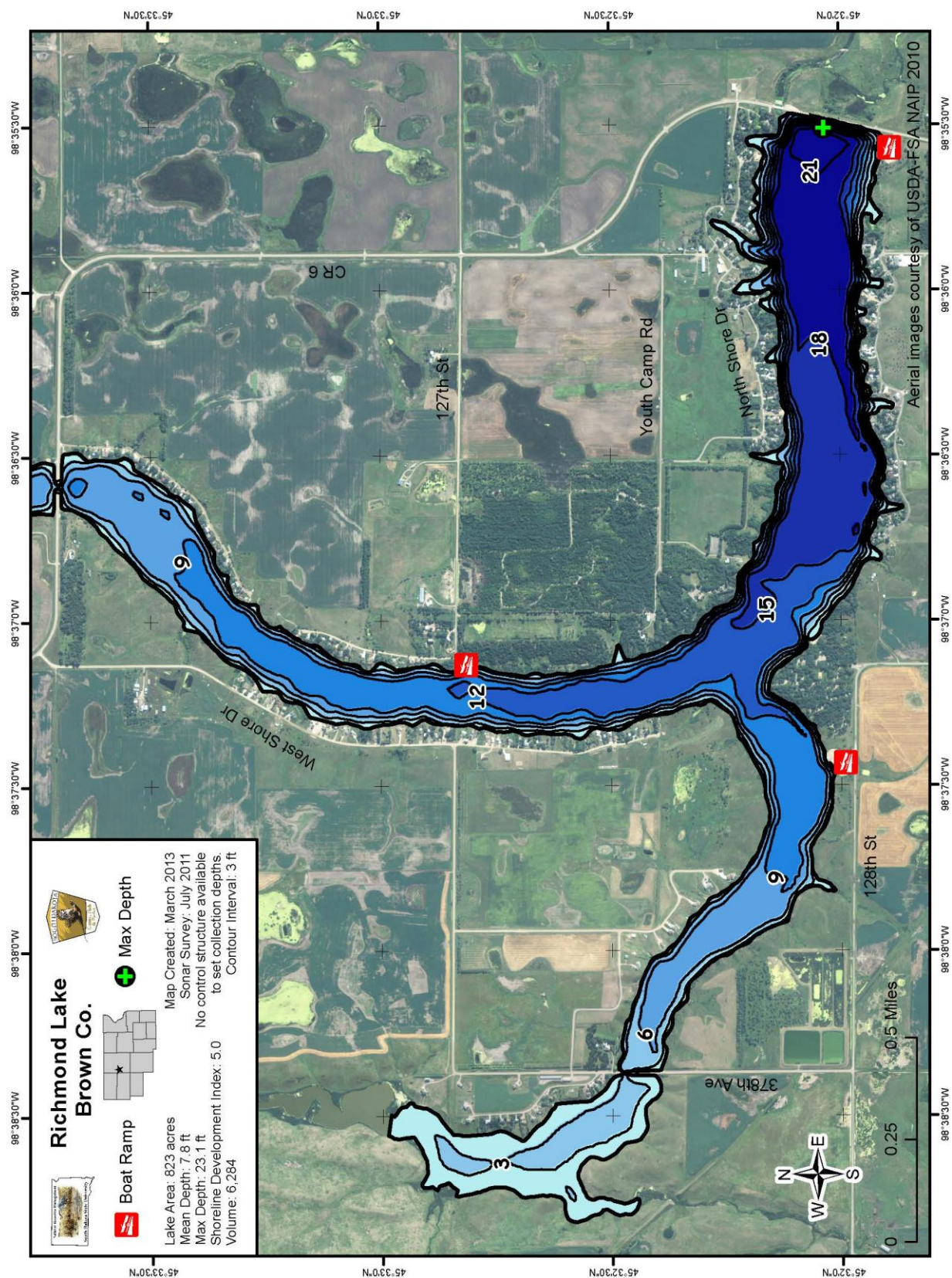


Figure 1. Map depicting access points and depth contours of Richmond Lake, Brown County, South Dakota.



Figure 2. Map depicting standardized net locations for Richmond Lake, Brown County, South Dakota. RMFN= frame nets, RMGN= gill nets

Management Objectives

- 1) Maintain a frame net mean CPUE of stock-length black crappie ≥ 10 , a PSD of 30-60, and a PSD-P of 5-10.
- 2) Maintain a frame net mean CPUE of stock-length bluegill ≥ 25 , a PSD of 30-60, and a PSD-P of 5-10.
- 3) Maintain a gill net mean CPUE of stock-length walleye ≥ 20 , a PSD of 10-40, and a PSD-P of <5 .
- 4) Maintain a frame net mean CPUE of stock-length black bullhead ≤ 100 .

Results and Discussion

Richmond Lake is an impoundment located 5 miles north and 4 miles west of Aberdeen, South Dakota. Richmond Lake was constructed by the damming of Foot Creek in the 1930's by the Works Progress Administration. Foot Creek (west arm) and an unnamed tributary (north arm) are the major surface water inlets to the lake. Water exits through an outlet on the east side of the lake flowing into Foot Creek and eventually draining into the James River (McLaury 2006).

Overall, as many as 16 species of fish have been collected from the lake. Currently, Richmond Lake is managed as a bluegill, black crappie, and walleye fishery. A high-density (i.e., mean gill net CPUE ≥ 20 stock-length walleye/net night) walleye population should be maintained to effectively impact black crappie and bluegill population size structures through predation.

Primary Species

Black crappie: In 2010, a die-off of black crappie, the cause of which is largely unknown, occurred in Richmond Lake. As a result, relative abundance was substantially reduced (Table 2). Since 2010, relative abundance has increased; the 2014 mean frame net CPUE of stock-length black crappie was 14.3 (Table 1; Table 2) and above the minimum objective (≥ 10 stock-length crappie/net night; Table 3). Currently, relative abundance is considered high.

Frame net captured black crappie ranged in TL from 14 to 24 cm (5.5 to 9.4 in; Figure 3). The PSD was 85 and above the management objective of 30-60; while no preferred-length crappie were captured (Table 1; Table 3; Figure 3).

Otoliths collected from a sub-sample of frame net captured black crappie showed that five year classes (2008-2012) were present (Table 4). The 2009 year class comprised 31% of black crappie in the frame net catch; while the 2010 cohort accounted for 59% (Table 4).

The weighted mean TL at capture of age-4 and age-5 individuals was 206 and 223 mm (8.1 and 8.8 in), respectively (Table 5). A decreasing trend in black crappie condition was apparent as TL increased; however, mean Wr values exceeded 90 for all 10-mm length groups represented.

Bluegill: The mean frame net CPUE of stock-length bluegill was 33.6 (Table 1) and above the minimum objective (≥ 25 stock-length bluegill/net night; Table 3). Since 2005, the mean frame net CPUE has fluctuated from a low of 19.5 (2013) to a high of 60.7 (2011; Table 2). Currently, relative abundance appears to be high.

Bluegill captured in the frame nets ranged in TL from 9 to 24 cm (3.5 to 9.4 in), had a PSD of 99 and a PSD-P of 35 (Table 1; Figure 4). Both the PSD and PSD-P were above the objective ranges of 30-60 and 5-10 (Table 3), indicating a population skewed towards larger individuals (Figure 4).

Otoliths collected from a sub-sample of frame net captured bluegill suggested the presence of seven year classes (2005, 2008-2013; Table 6). Year classes produced in 2009-2011 were the most abundant and collectively comprised approximately 92% of bluegill in the frame net catch (Table 6).

Bluegills in Richmond Lake typically surpass quality-length (15 cm; 6 in) by age 3 (Table 7). Since 2007, the weighted mean TL at capture of age-3 bluegill has ranged from 169 to 194 mm (6.7 to 7.6 in; Table 7). In 2014, the weighted mean TL at capture of age-3 bluegill was 181 mm (7.1 in; Table 7). Frame net captured bluegill had mean Wr values that were > 100 for all length categories (i.e., stock to quality) sampled; the mean Wr of stock-length bluegill was 110 (Table 1).

Walleye: The mean gill net CPUE of stock-length walleye was 1.8 (Table 1) and below the minimum objective (≥ 20 stock-length walleye/net night; Table 3). Since 2005, gill net mean CPUE values have ranged from a low of 1.5 (2008) to a high of 18.0 (2006; Table 2). Based on the 2014 gill net CPUE, relative abundance is low.

Walleye captured in the gill net catch ranged in TL from 18 to 40 cm (7.1 to 15.7 in; Figure 5). The PSD of 27 was below the management objective of 30-60 and no preferred-length individuals were captured (Table 1; Table 3; Figure 5). Size structure indices should be interpreted with caution as sample size was low (i.e., 15 stock-length walleye). In 2014, only 19% of gill net captured walleye exceeded the 38-cm (15-in) minimum length restriction (Figure 5).

The Richmond Lake walleye population has relied on large fingerling stockings to establish year-classes (Table 8; Table 10). Unfortunately, recruitment of large fingerling stocked walleye has declined in recent years when compared to year classes produced in the late-1990s and early-2000s (i.e., 1997, 2000, 2001, and 2004; Table 8; Kaufman et al. 2008). In 2014, otoliths were collected from a sub-sample of walleye in the gill net catch; six consecutive year classes (2008-2013) were present (Table 8). No age-0 walleye were captured during fall night electrofishing (Table 1), indicating a failed or weak naturally-produced year class in 2014. Therefore, 18,420 large fingerling walleye were stocked in October (Table 10); recruitment of these stocked fish is unknown and will be assessed in future surveys.

Growth rates can be influenced by the length at which large fingerlings are stocked into Richmond Lake, as the size of stocked fish can vary from year to year.

Walleyes typically achieve quality length and the minimum length limit (i.e., 38 cm; 15 in) during their fifth growing season at age-4 (Table 9). Since 2005, age-4 weighted mean TL at capture values have ranged from 370 to 522 mm (14.6 to 20.6 in; Table 9). However, due to low sample sizes weighted mean TL at capture values may at times represent few individuals (Table 9). In 2014, age-3 walleye, which were the most abundant, had a weighted mean TL at capture of 304 mm (12.0 in; Table 9). Although sample size was low, gill net captured walleye appeared to have acceptable condition with the mean W_r values that approached or exceeded 80 for all 10mm length groups represented.

Other Species

Black bullhead: Black bullhead was the most abundant fish species in the frame net catch (Table 1). The mean frame net CPUE of stock-length black bullhead was 99.2 (Table 1) and slightly below the management objective (≤ 100 stock-length bullhead/net night). The 2014 mean frame net CPUE represented a decrease from the 2013 CPUE of 229.2, but still suggested high relative abundance (Table 2).

Frame net captured black bullhead ranged in TL from 10 to 27 cm (3.9 to 10.6 in; Figure 6). The PSD was 72 and the PSD-P was 0 (Table 1; Table 3; Figure 6). No age and growth information was collected in 2014. All stock-length black bullhead sampled were in the stock-quality or quality-preferred length categories that had mean W_r values of 94 and 93, respectively.

White bass: White bass were first sampled in Richmond Lake during 2000 and have become well established (Table 2). Since 2005, mean frame net CPUE values have ranged from a low of 2.7 (2005, 2014) to a high of 59.7 (2006; Table 2). In 2014, the mean frame net CPUE of stock-length white bass was 2.7 (Table 1).

Frame net captured white bass ranged in TL from 22 to 37 cm (8.7 to 14.6 in), had a PSD of 98 and a PSD-P of 94 (Table 1; Figure 7). Limited recruitment and relatively fast growth to quality- and preferred-lengths contribute to the high size structure. No age and growth information was available in 2014. White bass in the frame net catch exhibited a slight decreasing trend in condition as TL increased. White bass in the preferred-memorable length category, which comprised a high proportion (94%) of the sample, had a mean W_r of 87.

Yellow perch: Yellow perch were the second most abundant fish species in the gill net catch. The 2014 gill net CPUE of 11.3 (Table 1) represented an increase from the 2013 CPUE of 8.3 (Table 2). Yellow perch in the gill net catch ranged in TL from 15 to 26 cm (5.9 to 10.2 in), had a PSD of 84 and PSD-P of 9 (Table 1; Figure 8).

Yellow perch populations are likely limited by habitat characteristics in Richmond Lake. However, a relatively- strong year class produced in 2011 has resulted in moderate relative abundance (Table 11). In 2014, the weighted mean TL at capture at age 3 was 215 mm (8.5 in; Table 12). Yellow perch in the gill net catch had mean W_r values > 95 for all length categories (e.g., stock to quality) sampled; stock-length individuals had a mean W_r of 102 (Table 1).

Other: Channel catfish, common carp, northern pike, and white sucker were other fish species captured in low numbers during the 2014 survey (Table 1).

Management Recommendations

- 1) Conduct fish community assessment surveys on an annual basis (next survey scheduled in summer 2015) to monitor fish relative abundance, fish population size structure, fish growth, and stocking success.
- 2) Collect otoliths from black crappie, bluegill, and walleye/saugeye to assess the age structure and growth rates of each population.
- 3) Consider re-introduction of saugeye into the population, as walleye recruitment has been poor in recent years. Stock saugeye (≈ 25 large fingerlings/acre) to establish additional year-classes if gill netting and/or fall night electrofishing CPUE of age-0 saugeye/walleye results warrant [i.e., low gill net CPUE of sub-stock (< 25 cm; 10 in) walleye/saugeye and/or fall night electrofishing CPUE of < 75 age-0 fish/hour].
- 4) Maintain the 381-mm (15 in) minimum length limit on saugeye/walleye. The regulation is designed to protect smaller fish from harvest and increase average fish size (Lucchesi and Blackwell 2009).
- 5) Maintain the 381-mm (15-in) minimum length limit on largemouth and smallmouth bass. The regulation is designed to improve population density and/or size structure (Blackwell and Lucchesi 2009).

Table 1. Mean catch rate (CPUE; gill/frame nets= catch/net night, electrofishing= catch/hour) of stock-length fish, proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish, and mean relative weight (Wr) of stock-length fish for various fish species captured in experimental gill nets, frame nets, and electrofishing in Richmond Lake, 2014. Confidence intervals include 80 percent (\pm CI-80) or 90 percent (\pm CI-90). BLB= black bullhead; BLC= black crappie; BLG= bluegill; CCF= channel catfish; COC= common carp; NOP= northern pike; WAE= walleye; WHB= white bass; WHS= white sucker; YEP= yellow perch

Species	Abundance		Stock Density Indices				Condition	
	CPUE	CI-80	PSD	CI-90	PSD-P	CI-90	Wr	CI-90
<i>Frame nets</i>								
BLB	99.2	31.3	72	2	---	---	93	1
BLC	14.3	7.3	85	4	---	---	98	1
BLG	33.6	8.5	99	1	35	3	110	1
CCF	0.4	0.3	50	36	---	---	95	4
COC	0.8	0.3	43	24	43	24	103	4
NOP	0.2	0.1	100	0	67	67	76	6
WAE	2.2	0.8	8	7	---	---	85	1
WHB	2.7	1.3	98	3	94	6	87	1
YEP	1.9	0.6	88	9	15	10	92	1
<i>Gill nets</i>								
BLB	90.7	17.4	59	3	---	---	107	1
BLC	0.7	0.5	100	0	---	---	103	3
BLG	0.2	0.2	100	---	---	---	117	---
CCF	0.2	0.2	100	---	---	---	129	---
COC	0.8	0.6	20	43	20	43	102	10
NOP	0.5	0.3	100	0	---	---	88	6
WAE	1.8	1.9	27	26	---	---	83	2
WHB	0.2	0.2	100	---	100	---	93	---
WHS	0.3	0.3	100	0	100	0	103	41
YEP	11.3	5.3	84	7	9	6	102	1
<i>Electrofishing</i>								
WAE ¹	0.0	---	---	---	---	---	---	---

¹ Fall night electrofishing-WAE; catch rate (CPUE) represents age-0 Walleye/hour

Table 2. Historic mean catch rate (CPUE; gill/frame nets= catch/net night, electrofishing= catch/hour) of stock-length fish for various fish species captured in experimental gill nets, frame nets, and electrofishing in Richmond Lake, 2005-2014. BLB= black bullhead; BLC= black crappie; BLG= bluegill; CCF= channel catfish; COC= common carp; LMB= largemouth bass; NOP= northern pike; PUS= pumpkinseed; ROB= rock bass; SMB= smallmouth bass; WAE= walleye; WHB= white bass; WHS= white sucker; YEP= yellow perch

Species	CPUE									
	2005	2006 ²	2007 ²	2008	2009	2010	2011	2012	2013	2014
<i>Frame nets</i>										
BLB	2.1	2.8	19.2	1.5	55.8	76.5	39.1	236.3	229.2	99.2
BLC	40.3	64.3	127.2	101.7	58.0	0.7	5.9	8.8	8.1	14.3
BLG	23.8	46.9	43.9	35.2	29.7	60.2	60.7	51.3	19.5	33.6
CCF	0.9	2.1	4.2	1.9	2.2	2.1	0.9	0.1	0.3	0.4
COC	3.3	0.9	1.3	1.9	0.4	0.4	0.1	0.4	0.2	0.8
LMB	0.0	0.2	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.0
NOP	0.3	0.3	0.2	0.3	0.1	0.7	0.6	0.4	0.1	0.2
PUS	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
ROB	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0
SMB	1.4	1.4	0.6	0.8	0.5	1.0	0.1	0.0	0.0	0.0
WAE	2.6	13.5	1.5	0.7	1.1	1.5	2.2	0.8	1.0	2.2
WHB	2.7	59.7	28.1	14.1	8.1	6.1	17.6	5.2	4.0	2.7
WHS	0.5	1.4	0.8	0.2	0.2	0.1	0.1	0.2	0.2	0.0
YEP	0.3	0.0	0.2	0.4	0.6	0.2	0.9	1.2	0.3	1.9
<i>Gill nets</i>										
BLB	1.3	4.0	6.3	3.5	11.0	12.5	24.7	108.5	109.0	90.7
BLC	4.7	18.4	27.2	61.3	13.0	0.2	0.2	1.0	2.1	0.7
BLG	0.7	1.0	0.2	0.3	0.3	1.5	0.5	1.3	1.0	0.2
CCF	0.7	1.6	2.7	2.5	2.2	1.3	2.2	2.2	1.5	0.2
COC	0.8	7.6	5.5	2.0	0.5	0.3	0.2	1.7	1.5	0.8
NOP	0.0	0.0	0.0	0.3	0.2	3.7	0.7	0.7	1.0	0.5
WAE	10.8	18.0	2.7	1.5	2.3	5.2	8.3	5.8	4.0	1.8
WHB	4.0	29.0	10.2	10.5	2.8	1.3	1.2	2.0	1.5	0.2
WHS	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.2	0.3
YEP	4.5	0.6	0.8	4.8	3.5	10.7	5.3	11.8	8.3	11.3
<i>Electrofishing</i>										
WAE ¹	0.0	0.0	0.0	2.9	0.0	0.0	34.0	0.0	0.0	0.0

¹ Fall night electrofishing-WAE; catch rate (CPUE) represents age-0 Walleye/hour

² Monofilament gill net mesh size change (0.75", 1.00", 1.25", 1.50", 2.00" and 2.50")

Table 3. Mean catch rate (CPUE; gill/frame nets= catch/net night), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish, and relative weight (Wr) for selected species captured in experimental gill nets and frame nets in Richmond Lake, 2005-2014. BLB= black bullhead; BLC= black crappie; BLG= bluegill; WAE= walleye

Species	2005	2006 [†]	2007 [†]	2008	2009	2010	2011	2012	2013	2014	Objective
<i>Frame nets</i>											
BLB											
CPUE	2	3	19	2	56	77	39	236	229	99	≤ 100
PSD	97	61	23	93	18	55	81	7	15	72	---
PSD-P	79	41	1	0	0	1	0	0	0	0	---
Wr	84	86	78	89	84	84	84	88	93	93	---
BLC											
CPUE	40	64	127	102	58	1	6	9	8	14	≥ 10
PSD	83	11	13	88	93	67	23	66	64	85	30-60
PSD-P	13	2	2	2	0	8	2	0	0	0	5-10
Wr	117	110	95	106	102	104	99	108	106	98	---
BLG											
CPUE	24	47	44	35	30	60	61	51	20	34	≥ 25
PSD	75	82	90	94	82	91	89	78	98	99	30-60
PSD-P	47	22	2	2	19	5	6	17	29	35	5-10
Wr	119	106	102	119	113	117	110	113	112	110	---
<i>Gill nets</i>											
WAE											
CPUE	11	18	3	2	2	5	8	6	4	2	≥ 20
PSD	32	34	81	67	7	10	30	54	21	27	10-40
PSD-P	3	3	44	11	0	0	2	6	8	0	< 5
Wr	90	83	78	83	88	89	90	84	83	83	---

[†] Monofilament gill net mesh size change (0.75", 1.00", 1.25", 1.50", 2.00" and 2.50")

Table 4. Year class distribution based on the expanded age/length summary for black crappie sampled in frame nets from Richmond Lake, 2013-2014.

Survey Year	Year Class						
	2014	2013	2012	2011	2010	2009	2008
2014			1	1	151	80	24
2013	---			51	95		

Table 5. Weighted mean TL (mm) at capture for black crappie sampled in frame nets (expanded sample size) from Richmond Lake, 2013-2014.

Year	Age					
	1	2	3	4	5	6
2014		143(1)	188(1)	206(151)	223(80)	220(24)
2013	---	191(51)	217(95)			

Table 6. Year class distribution based on the expanded age/length summary for bluegill sampled in frame nets from Richmond Lake, 2010-2014.

Survey Year	Year Class											
	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
2014		1	8	170	271	115	40			1		
2013	---		1	113	114	121	8	2	2			
2012	---	---		193	390	56	240	40		4		
2011	---	---	---		70	246	656	73	25	20		
2010	---	---	---	---			928	109		47		

Table 7. Weighted mean TL (mm) at capture for bluegill sampled in frame nets (expanded sample size) from Richmond Lake, 2007-2014.

Year	Age							
	1	2	3	4	5	6	7	8
2014	95(1)	150(8)	181(170)	196(271)	202(115)	221(40)	---	---
2013	122(1)	116(113)	185(114)	205(121)	193(8)	225(2)	227(2)	---
2012	119(193)	172(390)	189(56)	200(240)	207(40)	---	220(4)	---
2011	118(70)	158(246)	182(656)	198(73)	213(25)	215(20)	---	---
2010	---	161(928)	189(109)	---	215(47)	---	---	---
2009	90(62)	160(258)	194(50)	200(162)	---	---	227(2)	---
2008	100(32)	148(3)	179(590)	201(7)	---	---	---	---
2007	---	157(620)	169(95)	181(55)	194(6)	214(3)	226(10)	234(4)

[†] Older bluegill were sampled, but not reported in this table.

Table 8. Year class distribution based on the expanded age/length summary for walleye sampled in gill nets and associated stocking history (# stocked x 1,000) from Richmond Lake, 2010-2014.

Survey Year	Year Class													
	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
2014		4	1	8	1	1	1							
2013	---		4	20	9	2	1	2						
2012	---	---		2	13		16	5					1	
2011	---	---	---	2	8		37	7	2					
2010	---	---	---	---			17	11	3					
# stocked														
fry														
sm. fingerling														
lg. fingerling														
	18	27	10	15	12		4	12	24		33			61

Table 9. Weighted mean TL (mm) at capture for walleye age-1 through age-10 sampled in experimental gill nets (expanded sample size) from Richmond Lake, 2005-2014.

Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends.

Year	Age									
	1	2	3	4	5	6	7	8	9	10
2014	211(4)	254(1)	304(8)	396(1)	366(1)	406(1)	---	---	---	---
2013	218(4)	248(20)	311(9)	468(2)	493(1)	547(2)	---	---	---	---
2012	220(2)	309(13)	---	411(16)	454(5)	---	---	---	---	640(1)
2011 ¹	249(8)	---	361(37)	381(7)	424(2)	---	---	---	---	---
2010	---	305(17)	338(11)	370(3)	---	---	---	---	---	---
2009	233(14)	263(7)	318(6)	---	---	---	---	---	---	---
2008	203(3)	247(3)	---	404(3)	---	432(1)	480(1)	624(1)	495(1)	---
2007 ¹	205(3)	455(1)	380(5)	522(1)	---	542(1)	493(4)	---	521(1)	---
2006		329(60)	427(1)	411(3)	427(17)	470(7)	634(1)	593(1)	---	---
2005 ¹	245(47)	---	300(1)	375(39)	434(4)	---	564(1)	495(1)	---	---

¹ Older walleye were sampled, but are not reported in this table

Table 10. Stocking history including size and number for fishes stocked into Richmond Lake, 2000-2014. CCF= channel catfish; WAE= walleye

Year	Species	Size	Number
2000	CCF	large fingerling	25,000
	WAE	large fingerling	9,285
2001	WAE	large fingerling	60,984
2004	WAE	large fingerling	32,535
2006	WAE	large fingerling	23,828
2007	WAE	large fingerling	11,766
2008	WAE	large fingerling	4,218
2010	WAE	large fingerling	11,788
2011	WAE	large fingerling	15,240
2012	WAE	large fingerling	10,173
2013	WAE	large fingerling	27,344
2014	WAE	large fingerling	18,420

Table 11. Year class distribution based on the expanded age/length summary for yellow perch sampled in gill nets from Richmond Lake, 2011-2014.

Survey Year	Year Class										
	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004
2014		4		45	11	8					
2013	---			22	18	10					
2012	---	---		11	20	38					
2011	---	---	---		3	26	2				1

Table 12. Weighted mean TL (mm) at capture by gender for yellow perch captured in experimental gill nets (expanded sample size) from Richmond Lake, 2011-2014.

Year	Age						
	1	2	3	4	5	6	7
2014							
Male	156(1)	---	206(18)	226(4)	222(1)	---	---
Female	174(3)	---	221(27)	246(7)	251(7)	---	---
Combined	169(4)	---	215(45)	238(11)	247(8)	---	---
2013							
Male	---	190 (8)	203 (2)	213 (4)	---	---	---
Female	---	191 (14)	224 (16)	238 (6)	---	---	---
Combined	---	191 (22)	222 (18)	228 (10)	---	---	---
2012							
Male	145 (1)	190 (8)	213 (11)	---	---	---	---
Female	150 (8)	196 (12)	217 (27)	---	---	---	---
Combined	148 (11)	194 (20)	216 (38)	---	---	---	---
2011							
Male	154 (1)	188 (8)	233 (2)	---	---	---	---
Female	146 (2)	197 (18)	---	---	---	---	297 (1)
Combined	149 (3)	194 (26)	233 (2)	---	---	---	297 (1)

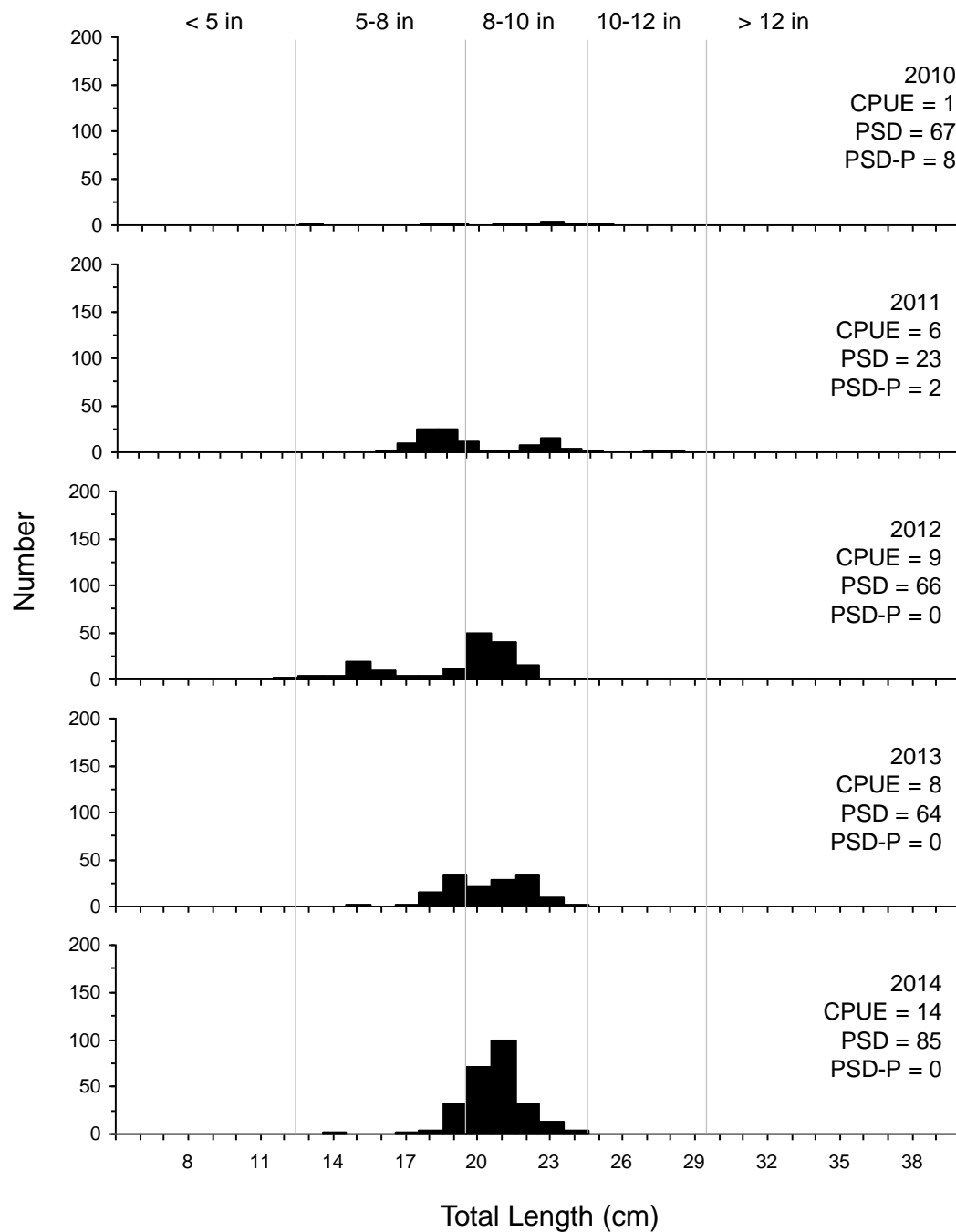


Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for black crappie captured using frame nets in Richmond Lake, 2010-2014.

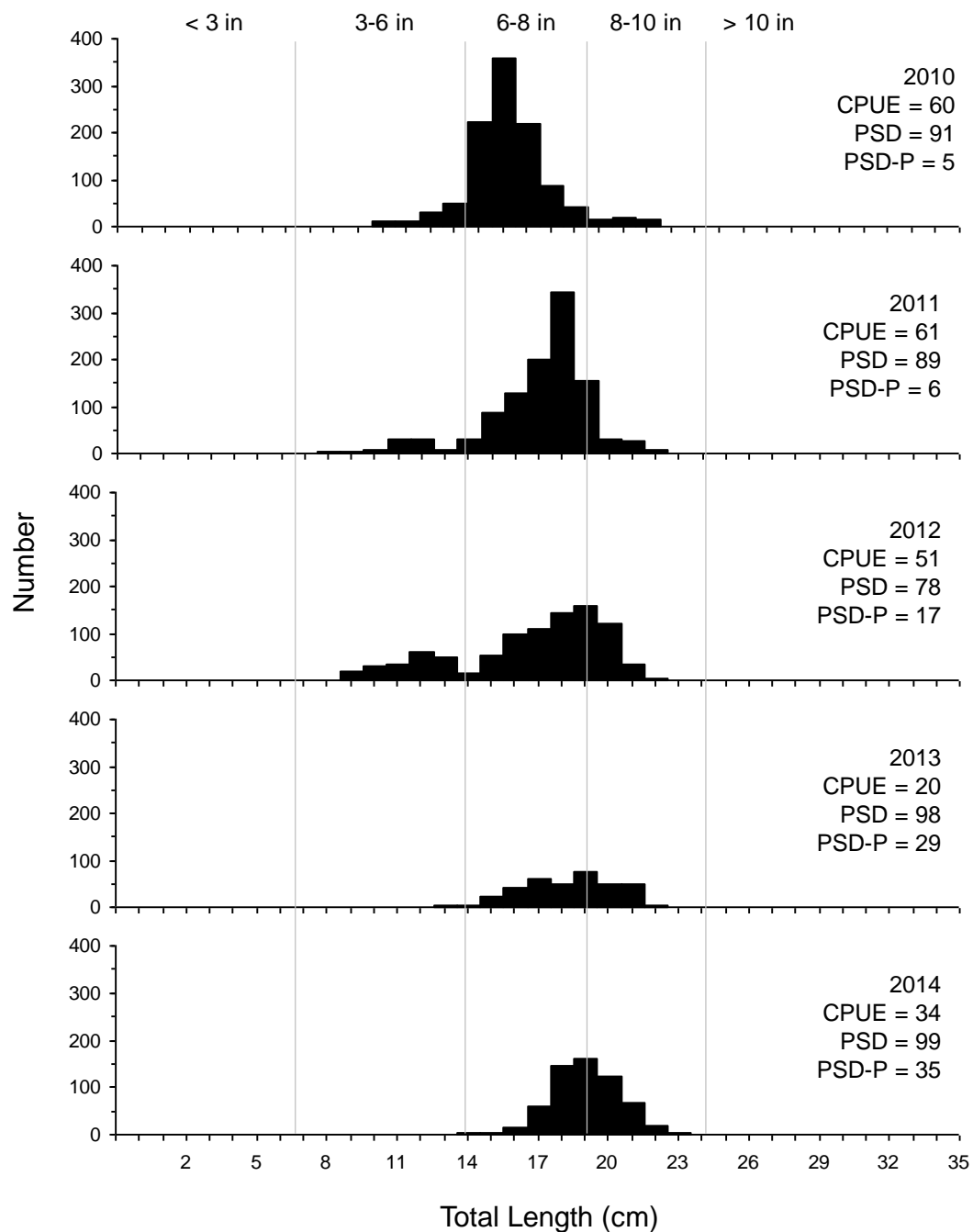


Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for bluegill captured using frame nets in Richmond Lake, 2010-2014.

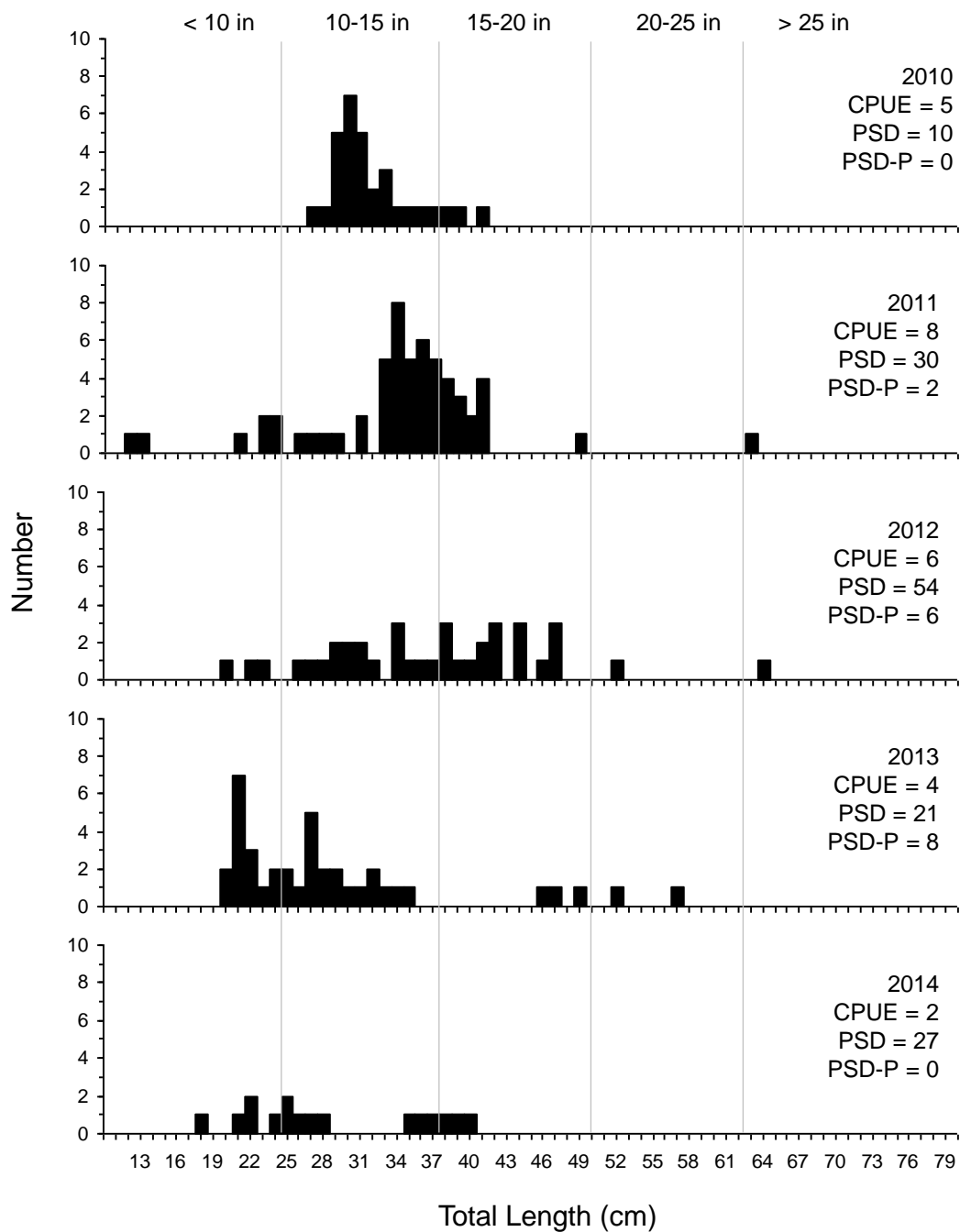


Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for walleye captured using gill nets in Richmond Lake, 2010-2014.

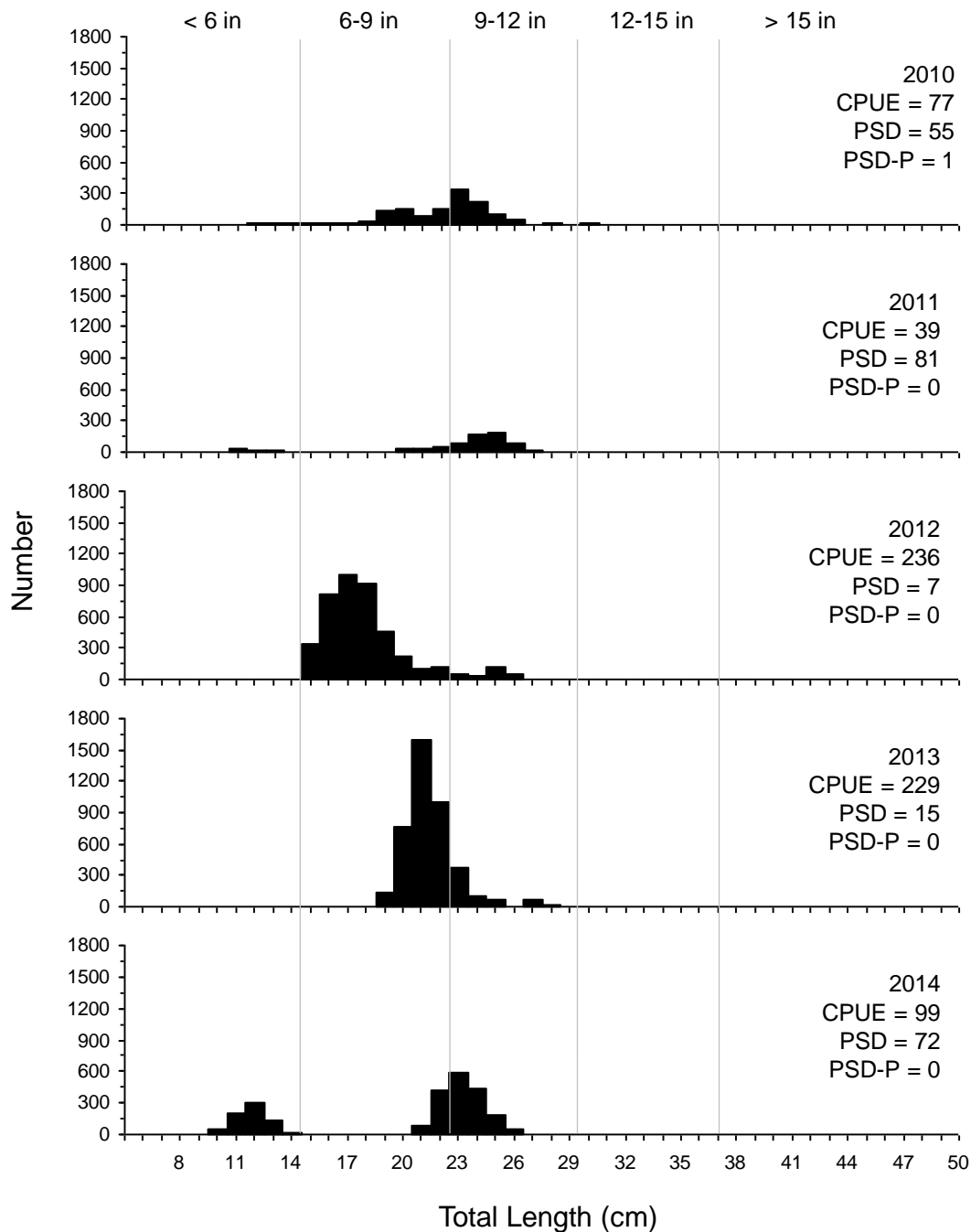


Figure 6. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for black bullhead captured using frame nets in Richmond Lake, 2010-2014.

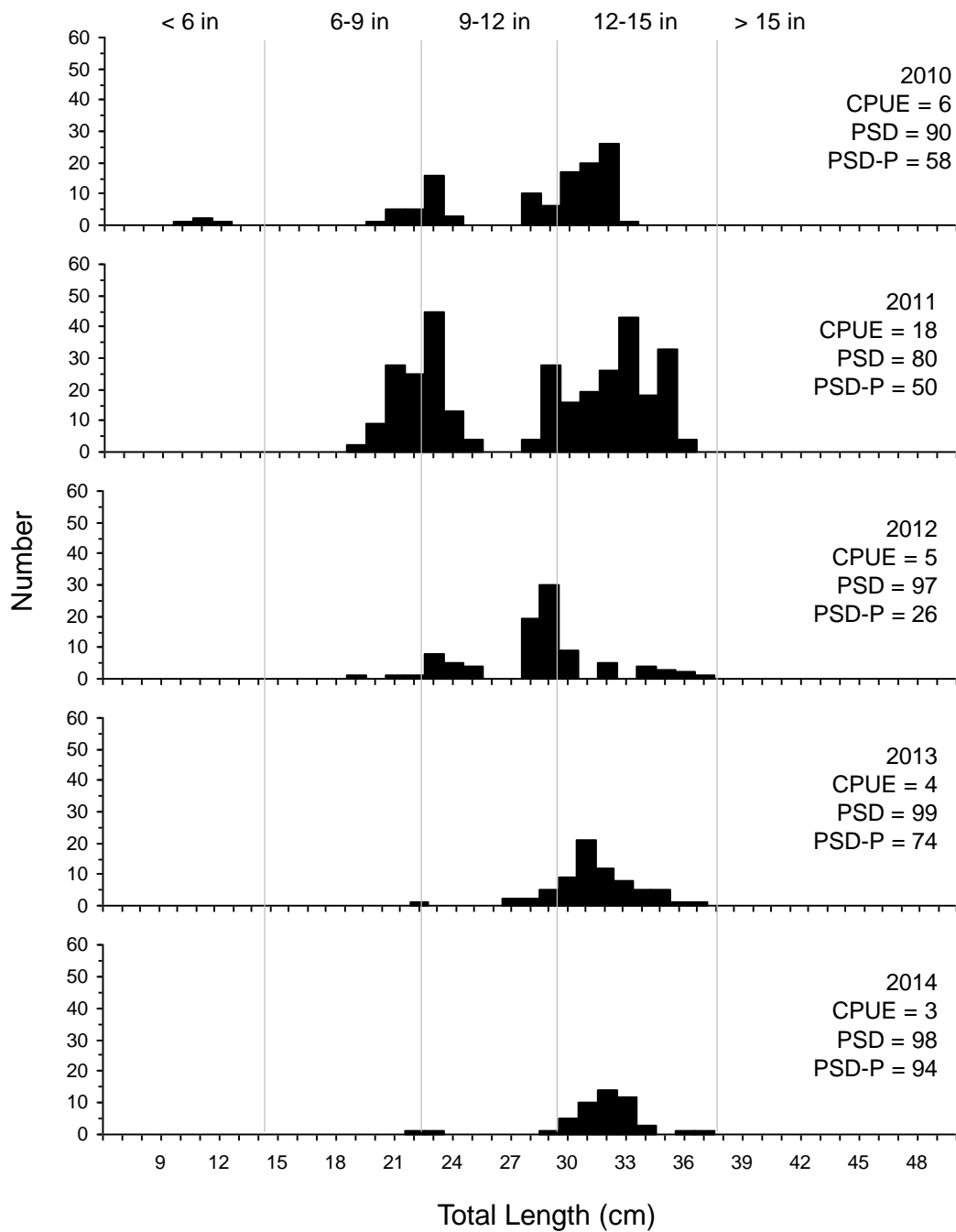


Figure 7. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for white bass captured using frame nets in Richmond Lake, 2010-2014.

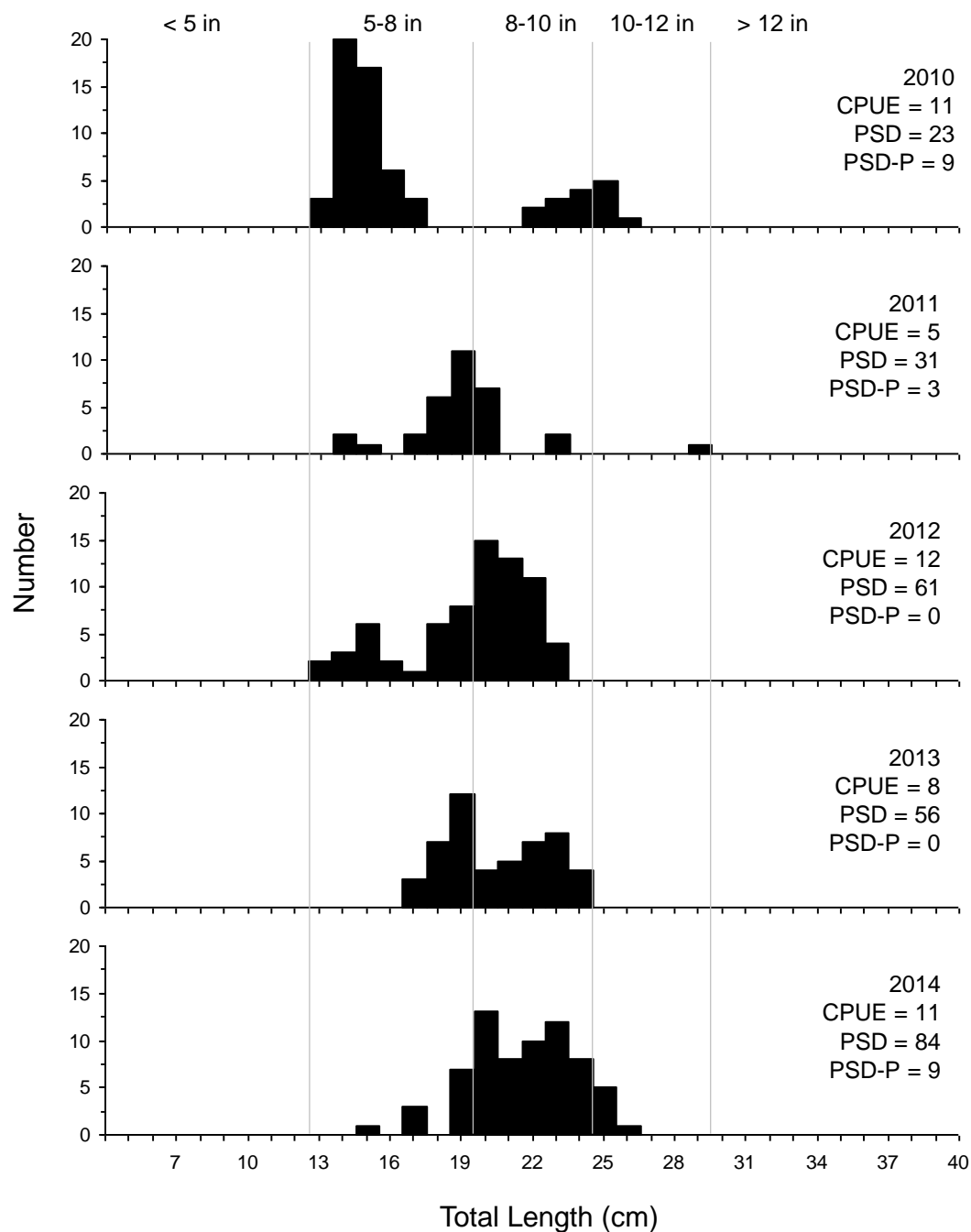


Figure 8. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for yellow perch captured using gill nets in Richmond Lake, 2010-2014.